

WHAT IS CLAIMED IS:

1. A radiotherapy apparatus comprising:

an irradiation head having a linear accelerator
and an intra-head waveguide unit whose one end portion
5 is electromagnetically connected to the linear
accelerator;

a supporting moving mechanism which supports and
moves the irradiation head on predetermined first
spherical coordinates;

10 a microwave oscillator which generates microwaves
to be supplied to the irradiation head, and which is
placed in a stationary position;

a fixed waveguide unit having one end portion
electromagnetically connected to the microwave
15 oscillator, and the other end portion positioned on the
supporting moving mechanism; and

a moving waveguide unit having one end portion
electromagnetically connected to the other end portion
of the fixed waveguide unit positioned on the
20 supporting moving mechanism, and the other end portion
electromagnetically connected to the other end portion
of the intra-head waveguide unit.

2. A radiotherapy apparatus according to claim 1,
wherein the moving waveguide unit comprises means which
25 moves on second spherical coordinates related to the
first spherical coordinates.

3. A radiotherapy apparatus according to claim 1,

wherein the intra-head waveguide unit, fixed waveguide unit, and moving waveguide unit include a waveguide and rotary RF coupler.

4. A radiotherapy apparatus according to claim 1,
5 wherein the moving waveguide unit comprises
a pantograph mechanism including a waveguide and rotary RF coupler which open and close in accordance with the movement of the irradiation head.

5. A radiotherapy apparatus according to claim 4,
10 wherein the pantograph mechanism comprises means which closes in a direction away from a patient to be irradiated with therapeutic radiation from the irradiation head.

6. A radiotherapy apparatus according to claim 5,
15 wherein the fixed waveguide unit is installed along the ceiling and wall of a therapy room.

7. A radiotherapy apparatus according to claim 1,
wherein at least one of the intra-head waveguide unit and fixed waveguide unit includes a bent waveguide.

20 8. A radiotherapy apparatus according to claim 1,
wherein at least one of the intra-head waveguide unit and fixed waveguide unit includes a flexible waveguide.

9. A radiotherapy apparatus according to claim 3,
25 wherein the rotary RF coupler includes a first cylindrical member having one end to which a waveguide is connected, and a second cylindrical member which has the same axis as the first cylindrical member, one end

of which is rotatably connected to the other end of the first cylindrical member, and to the other end of which another waveguide is connected.

10. A radiotherapy apparatus according to claim 3,
5 wherein the rotary RF coupler includes a magnetic seal which seals at least one of an internal vacuum and sealed gas.

11. A radiotherapy apparatus according to claim 1,
10 wherein the irradiation head comprises a gimbal mechanism which rotates the irradiation head in at least two orthogonal directions.

12. A radiotherapy apparatus according to claim 1, further comprising:

15 an isocentric rotating mechanism which rotates the irradiation head around an isocenter; and

a pseudo non-isocentric rotating mechanism which rotates the irradiation head in a position where the irradiation head is rotated a predetermined angle by the isocentric rotating mechanism.